

ZGFM5913B-AF THRU ZGFM5956B-AF**List**

List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4-5
Pinning information.....	6
Suggested solder pad layout.....	6
Packing information.....	7
Reel packing.....	8
Suggested thermal profiles for soldering processes.....	8
High reliability test capabilities.....	9

ZGFM5913B-AF THRU ZGFM5956B-AF

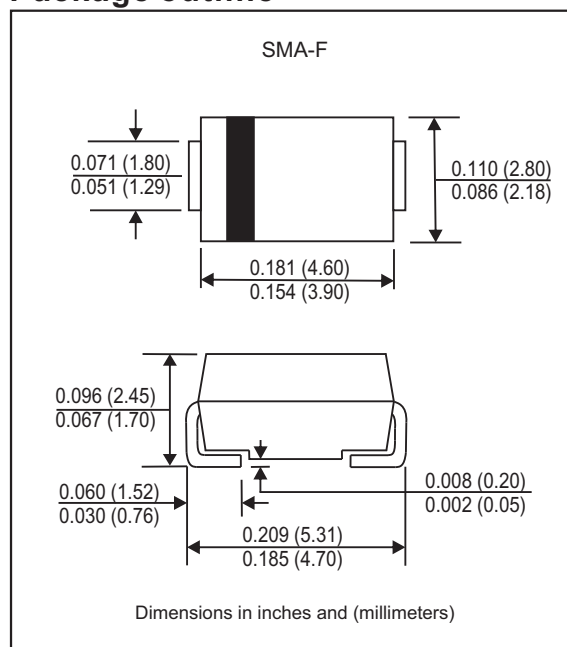
**1.5W Surface Mount
Zener Diodes 3.3V-200V**

Features

- Wide zener reverse voltage range 3.3V to 200V
- Small package size for high density applications
- Ideally suited for automated assembly processes
- Standard zener voltage tolerance $\pm 5\%$
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. ZGFM5913B-AF-H

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AC / SMA-F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.055 gram

Package outline**Maximum ratings** (at $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Power dissipation at $T_L=75^\circ\text{C}$ (Note 1)		P_D			1.5	W
Forward voltage	$I_F = 200 \text{ mA}$	V_F			1.5	V
Operating junction temperature range		T_J			+150	$^\circ\text{C}$
Storage temperature range		T_{STG}	-55		+150	$^\circ\text{C}$

Note:

1. P.C.B. Mounted on 0.31x0.31x0.08" (8x8x2mm) copper areas pads.

ZGFM5913B-AF THRU ZGFM5956B-AF

Electrical characteristics (at $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part No.	Marking code	Zener voltage			Test current	Zener impedance			Leakage current		Maximum Regulator current
		Vz @ IzT(V)			IzT	ZzT @ IzT	Zzk @ IzK	IzK	IR	VR	IzM
		Min.	Nom.	Max.	mA	(Ω)Max	(Ω)Max	mA	(uA)Max	Volts	mA
ZGFM5913B-AF	5913B,913A	3.14	3.3	3.47	113.6	10.0	500	1.00	100	1.0	454
ZGFM5914B-AF	5914B,914A	3.42	3.6	3.78	104.2	9.0	500	1.00	75	1.0	416
ZGFM5915B-AF	5915B,915A	3.71	3.9	4.1	96.1	7.5	500	1.00	25	1.0	384
ZGFM5916B-AF	5916B,916A	4.09	4.3	4.52	87.2	6.0	500	1.00	5	1.0	348
ZGFM5917B-AF	5917B,917A	4.47	4.7	4.94	79.8	5.0	500	1.00	5	1.5	319
ZGFM5918B-AF	5918B,918A	4.85	5.1	5.36	73.5	4.0	400	1.00	5	2.0	294
ZGFM5919B-AF	5919B,919A	5.32	5.6	5.88	66.9	2.0	300	1.00	5	3.0	267
ZGFM5920B-AF	5920B,920A	5.89	6.2	6.51	60.5	2.0	200	1.00	5	4.0	241
ZGFM5921B-AF	5921B,921A	6.46	6.8	7.14	55.1	2.5	200	1.00	5	5.2	220
ZGFM5922B-AF	5922B,922A	7.13	7.5	7.88	50.0	3.0	400	0.50	5	6.0	200
ZGFM5923B-AF	5923B,923A	7.79	8.2	8.61	45.7	3.5	400	0.50	5	6.5	182
ZGFM5924B-AF	5924B,924A	8.65	9.1	9.56	41.2	4.0	500	0.50	5	7.0	164
ZGFM5925B-AF	5925B,925A	9.50	10	10.50	37.5	4.5	500	0.25	5	8.0	150
ZGFM5926B-AF	5926B,926A	10.45	11	11.55	34.1	5.5	550	0.25	1	8.4	136
ZGFM5927B-AF	5927B,927A	11.40	12	12.60	31.2	6.5	550	0.25	1	9.1	125
ZGFM5928B-AF	5928B,928A	12.35	13	13.65	28.8	7	550	0.25	1	9.9	115
ZGFM5929B-AF	5929B,929A	14.25	15	15.75	25.0	9	600	0.25	1	11.4	100
ZGFM5930B-AF	5930B,930A	15.20	16	16.80	23.4	10	600	0.25	1	12.2	93
ZGFM5931B-AF	5931B,931A	17.10	18	18.90	20.8	12	650	0.25	1	13.7	83
ZGFM5932B-AF	5932B,932A	19.00	20	21.00	18.7	14	650	0.25	1	15.2	75
ZGFM5933B-AF	5933B,933A	20.90	22	23.10	17.0	18	650	0.25	1	16.7	68
ZGFM5934B-AF	5934B,934A	22.80	24	25.20	15.6	19	700	0.25	1	18.2	62
ZGFM5935B-AF	5935B,935A	25.65	27	28.35	13.9	23	700	0.25	1	20.6	55
ZGFM5936B-AF	5936B,936A	28.50	30	31.50	12.5	26	750	0.25	1	22.8	50
ZGFM5937B-AF	5937B,937A	31.35	33	34.65	11.4	33	800	0.25	1	25.1	45
ZGFM5938B-AF	5938B,938A	34.20	36	37.80	10.4	38	850	0.25	1	27.4	41
ZGFM5939B-AF	5939B,939A	37.05	39	40.95	9.6	45	900	0.25	1	29.7	38
ZGFM5940B-AF	5940B,940A	40.85	43	45.15	8.7	53	950	0.25	1	32.7	34
ZGFM5941B-AF	5941B,941A	44.65	47	49.35	8.0	67	1000	0.25	1	35.8	31
ZGFM5942B-AF	5942B,942A	48.45	51	53.55	7.3	70	1100	0.25	1	38.8	29
ZGFM5943B-AF	5943B,943A	53.20	56	58.80	6.7	86	1300	0.25	1	42.6	26
ZGFM5944B-AF	5944B,944A	58.90	62	65.10	6.0	100	1500	0.25	1	47.1	24
ZGFM5945B-AF	5945B,945A	64.60	68	71.40	5.5	120	1700	0.25	1	51.7	22
ZGFM5946B-AF	5946B,946A	71.25	75	78.75	5.0	140	2000	0.25	1	56.0	20
ZGFM5947B-AF	5947B,947A	77.90	82	86.10	4.6	160	2500	0.25	1	62.2	18
ZGFM5948B-AF	5948B,948A	86.45	91	95.55	4.1	200	3000	0.25	1	69.2	16
ZGFM5949B-AF	5949B,949A	95.00	100	105.0	3.7	250	3100	0.25	1	76.0	15
ZGFM5950B-AF	5950B,950A	104.5	110	115.5	3.4	300	4000	0.25	1	83.6	13
ZGFM5951B-AF	5951B,951A	114.0	120	126.0	3.1	380	4500	0.25	1	91.2	12
ZGFM5952B-AF	5952B,952A	123.5	130	136.5	2.9	450	5000	0.25	1	98.8	11
ZGFM5953B-AF	5953B,953A	142.5	150	157.5	2.5	600	6000	0.25	1	114.0	10
ZGFM5954B-AF	5954B,954A	152.0	160	168.0	2.3	700	6500	0.25	1	121.6	9.0
ZGFM5955B-AF	5955B,955A	171.0	180	189.0	2.1	900	7000	0.25	1	136.8	8.0
ZGFM5956B-AF	5956B,956A	190.0	200	210.0	1.9	1200	8000	0.25	1	152.0	7.0

Rating and characteristic curves (ZGFM5913B-AF THRU ZGFM5956B-AF)

FIG.1 STEADY STATE POWER DERATING

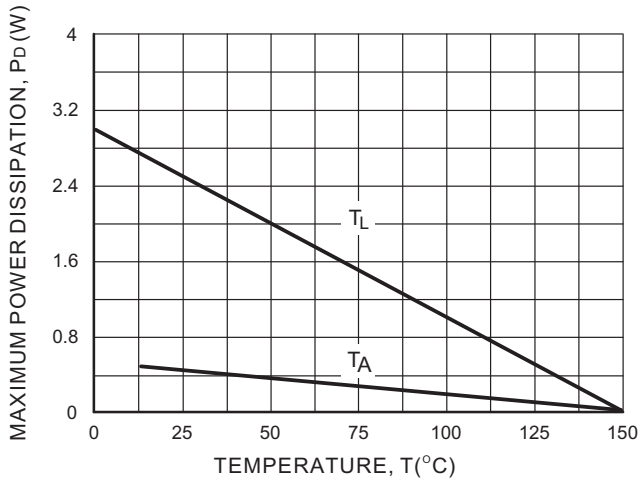


FIG.2 ZENER VOLTAGE 3.3 THRU 10 VOLTS

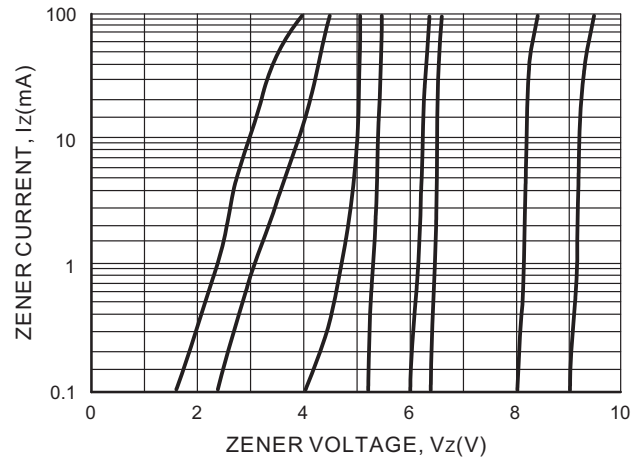


FIG.3 ZENER VOLTAGE 11 THRU 68 VOLTS

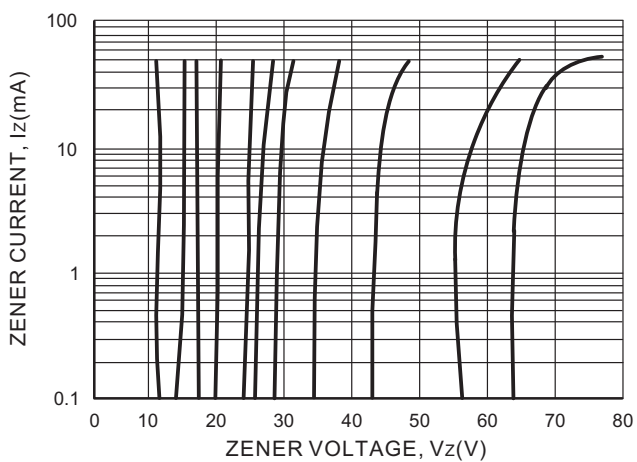


FIG.4 ZENER VOLTAGE 3.3 THRU 11 VOLTS

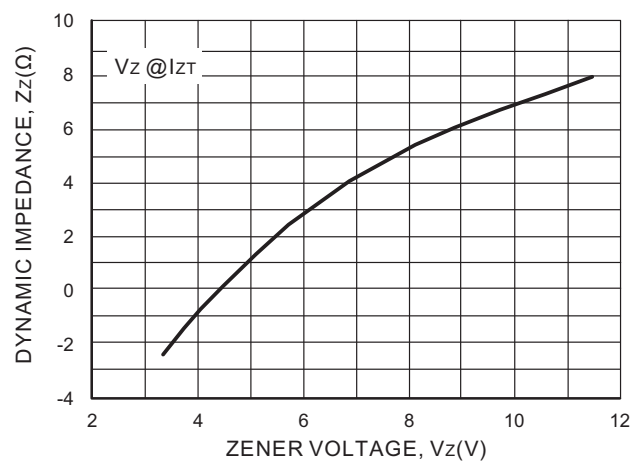


FIG.5 ZENER VOLTAGE 12 THRU 68 VOLTS

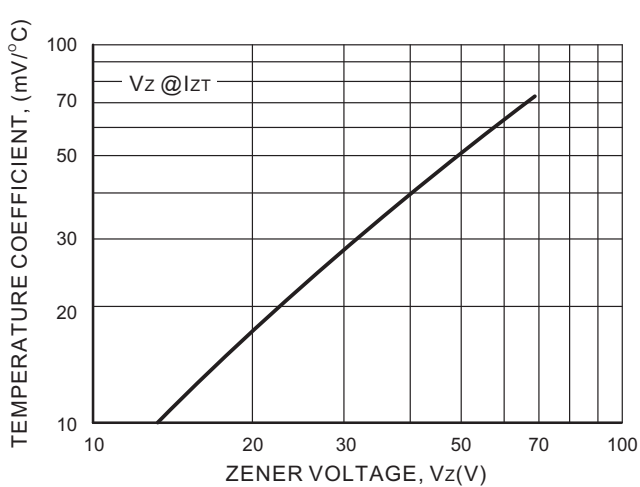
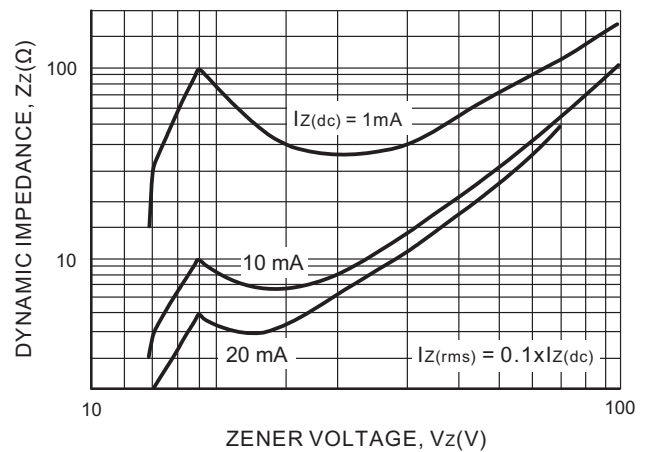


FIG.6 EFFECT OF ZENER VOLTAGE



Rating and characteristic curves (ZGFM5913B-AF THRU ZGFM5956B-AF)

FIG.7 CAPACITANCE CURVE

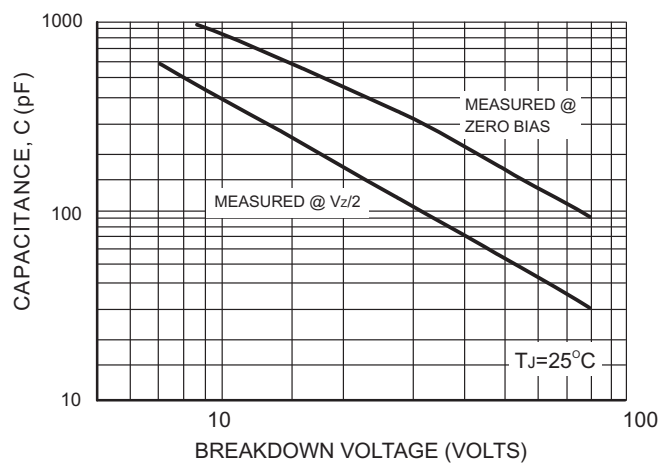
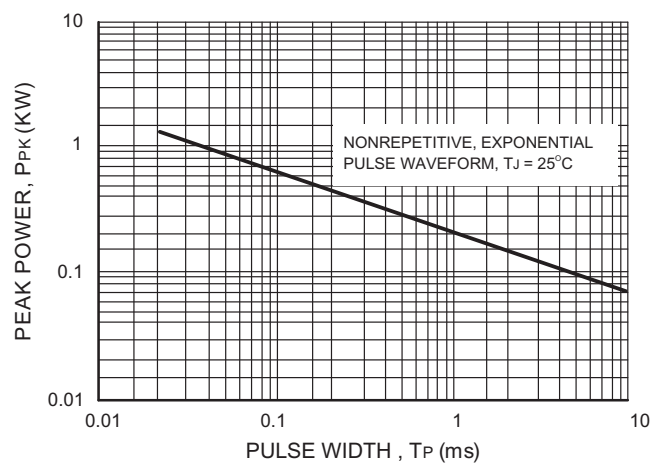


FIG.8 TYPICAL PULSE RATING CURVE

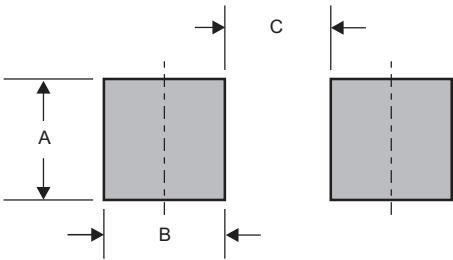


ZGFM5913B-AF THRU ZGFM5956B-AF

Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Suggested solder pad layout

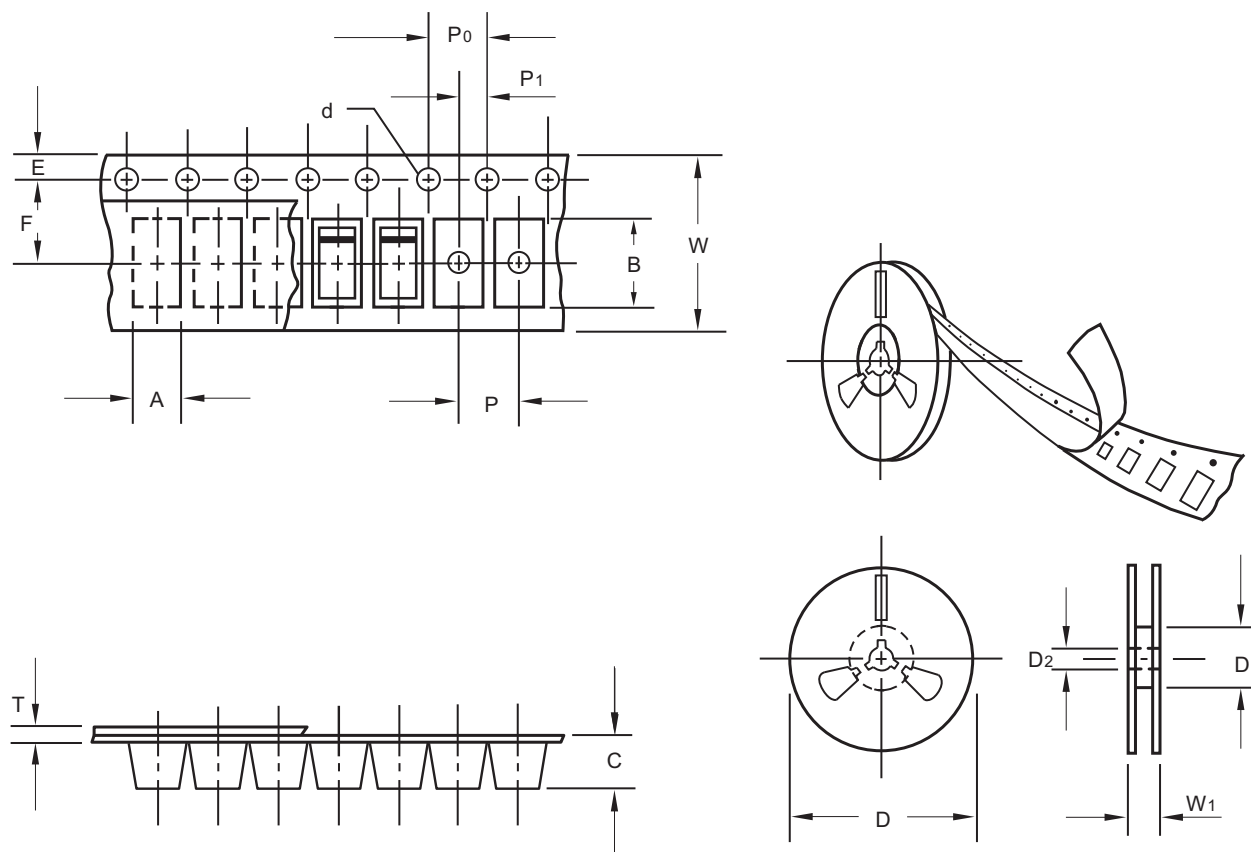


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMA-F	0.068 (1.70)	0.104 (2.60)	0.060(1.50)

ZGFM5913B-AF THRU ZGFM5956B-AF

Packing information



unit:mm

Item	Symbol	Tolerance	SMA-F
Carrier width	A	0.1	2.79
Carrier length	B	0.1	5.33
Carrier depth	C	0.1	2.36
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	72.00
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.30
Tape width	W	0.3	12.00
Reel width	W1	1.0	18.00

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

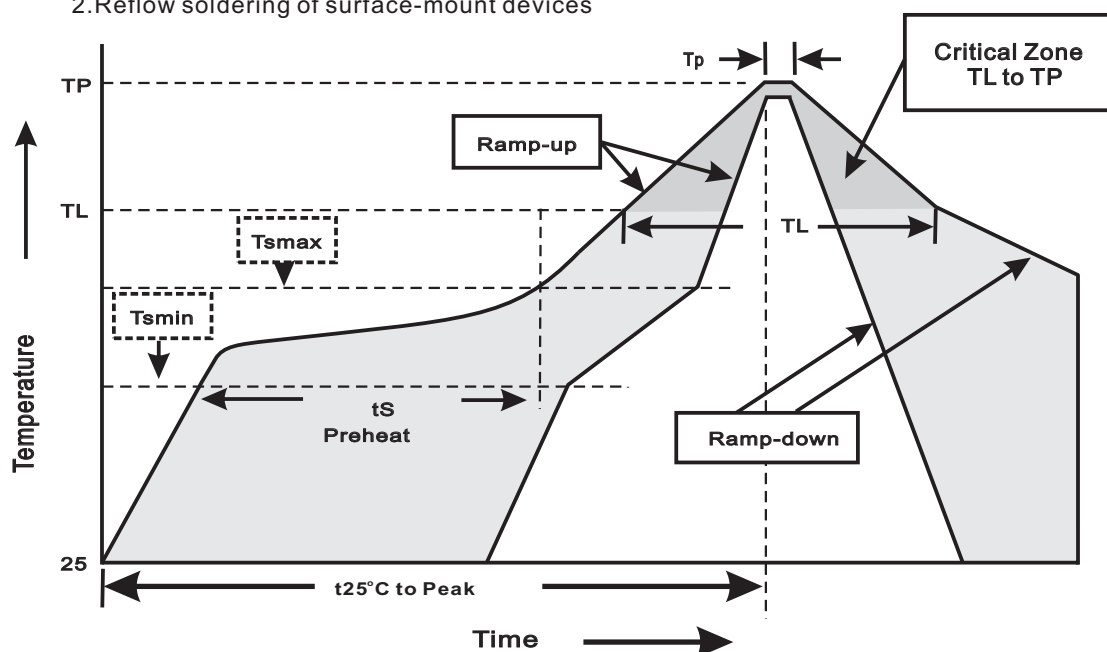
ZGFM5913B-AF THRU ZGFM5956B-AF

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA. (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SMA-F	11"	5,000	4.0	10,000	290*290*40	278	350*330*360	80,000	13.50

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C/sec}$
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{smax} to T_L -Ramp-upRate	$<3^{\circ}\text{C/sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	$<6^{\circ}\text{C/sec}$
Time 25°C to Peak Temperature	$<6\text{ minutes}$

ZGFM5913B-AF THRU ZGFM5956B-AF

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^\circ\text{C}$ for 10 ± 2 sec.	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^\circ\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_z = V_{z\text{Nom}} * 80\%$ at $T_j = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_A = 121^\circ\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^\circ\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031